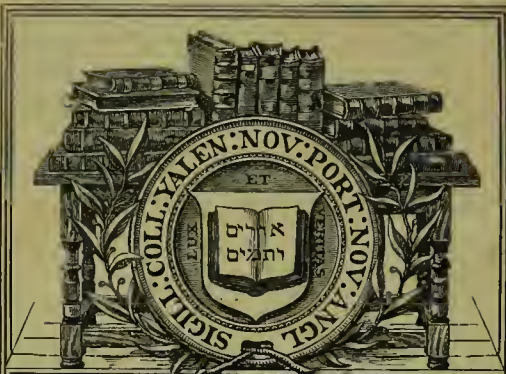


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The use of quinine during the
Civil War.

John W.Churchman.

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THE USE OF QUININE DURING THE CIVIL WAR.

BY JOHN W. CHURCHMAN, M. D.,

Late Clinical Assistant, Johns Hopkins Hospital.

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If coffee, cathartics, and ammunitions were the sinews of [175] the Civil War—arranged in order of importance—quinine was the staple that would have been, after these three and perhaps after whiskey, most missed. In the early days of the century, when surgery was still so largely a question of fractures and emergencies, and when medicine was only beginning to know the interest and advance which were to come with applied microscopy and chemistry and physics, quinine was arousing a lively interest indeed. And it was an interest destined to [176] continue on through its seventh and eighth decades.

From that pride and scandal of medicine—the Surgeon General's catalogue—one may obtain a fair idea of the attention this drug was demanding in the days when the Missouri Compromise and the policy of the Free Soilers, and the Omnibus Bill were the vital things, and Henry Clay and Dred Scott and John Brown the names in the headlines. The literature of the subject rapidly took on dimensions. Articles appeared on almost every conceivable phase of the question. Inaugural theses and ephemeral articles were written on the pharmaceutical preparation of the drug, on the procedure of extraction, on its detection in the urine, on quantitative and qualitative chemical analysis, on the solubility of its salts. Elaborate dissertations appeared labeled, "On the Sulphate of Quinine." Historical studies were published, the beautiful

¹Read before the Johns Hopkins Hospital Historical Club, May 8, 1905.

1761 Countess of Chinchon always appearing in one of the early aets. Search for febrifuges to be used as substitutes was instigated, experimental work was carried out as to the action of the drug on this organ and that. Methods were published for the recognition of adulterations. Quinine salts, from the arseniate to the valerianate and back again, came to the fore. Learned discussions took place as to its action on the uterus and to decide whether it were an oxytocic, an embolic, or a partus accelerator—a question which seems to have kept the profession awake nights in the 70's and 80's. Then its dosage was discussed; and methods for disguising its taste invented, and new routes for its administration suggested and accidents following its use reported. Even the surgeons looked to the drug with hope and articles appeared on its antiseptic value and application to surgery. But clinicians were the chief contributors; and the drug was administered in nearly every disease known to man. Convulsions, erysipelas, neuralgia, rheumatism, typhoid, yellow, malarial, and puerperal fevers—these were only a few of its indications. It was used for its effect on the pulse, it was used topically, it was used to reduce an enlarged spleen. It was advised by one observer in “brain disease,” and its power in accelerating the action of mercurials was lauded by another. The diseases of childhood seemed to indicate it particularly and “the quinine rub for children” was lauded in a French article.

Even the followers of Hahnemann contributed to the discussion; and it was really little wonder that before long “abuse” began to take the place of “use” in the titles and that a generation of practitioners had sprung up trained to transform their patients' mouths into funnels gaping for quinine.

But for the military interests of the nation an added attention had been given to this drug by the experiences of the strife waging with the Seminoles during the early 40's.

Florida, the scene of this distressing and protracted warfare, was hardly the best State into which to send soldiers unless the supply at home were unlimited. It was the State of hammocks and savannas, of disappearing lakes and streams, of lime-sinks, bay galls, and bad water. From May to

August the rain fell in torrents. The humidity was great, the [176] dew-point high, the mean temperature from 80° to 82°. Lake Tuscawilla suddenly disappearing subterraneously in 1838 and leaving a mushy bog behind it, Lake Orange gradually passing from sight throughout several years—these were samples of what not unusually happened. “A dead level,” said a medical writer of the time, “and a half drained country alternately drenched with rain and broiled by an almost tropical sun—reeking with the steam from ten thousand swamps, lagoons, bogs, and savannas—would furnish ample materials for vegetable decomposition and miasmatic effluvia.” And such material was indeed furnished. “All fevers of malarial origin”—intermittents, remittents, congestive fevers, dysentery—prevailed throughout the State. The first sign, indeed, of residence in Florida—so it was said at the time—was the cutaneo-hepatic sympathy of Dr. James Johnson; an increase of perspiration with an increase and vitiation of bile. Then followed a series of symptoms characterized by increasing malaise, impaired digestion, growing irritability, pallor, languor, and tendency to venous congestion; leading, in the end, to a frank attack of fever—the two never-failing signs of an oncoming attack being peculiar sensations in the right hypochondrium (attributed to hepatic engorgement) and the passage of dark red urine, small in amount. Finally when the attack was over the patient who had brought a vigorous constitution from the north, was left permanently pale, languid, with a poor digestion, torpid liver, muscular debility, and great susceptibility to atmospheric changes. Such was the attraction offered to immigration. And this state of affairs existed not only in the regions of marshes. Malaria was noticeably present in the barren and sandy portions as well—its presence being explained at the time by the geological character of the soil which was studied in great detail. The prevailing northwest winds were also held to account for much of the disease—a pretty distinct relation being established between the occurrence of miasms and the land breezes. Also the drinking of water in the limestone and alluvial regions must, it was thought, have some etiological relation to the diseases; for had not Dr. Rush said, “There can be no doubt of the predisposi-

[176] tion to fevers being increased by the use of impure water," and could it be otherwise? So miasma and impure water did valiant scapegoat service while the real sinner went all unrecognized, close at hand. "During the summer season," wrote Dr. Little, describing conditions in middle Florida, "our ears are assailed by the buzzing of myriads of mosquitoes in their murderous attacks. So formidable are their stings that cattle and deer are often compelled to leave the swamps and take up their residence in the pine woods to avoid them." With dead level, then, and a country half drained, with drenching rains and a broiling sun, with marshes and bogs and lagoons, with favorable wind and soil and unfavorable water, with myriads of murderous mosquitoes doing deadly work, it was no wonder that malaria, as Assistant Surgeon Porter put it, was "the great primary and specific cause of most of the diseases of Florida." And so, indeed, the recruits from the North—

[177] sent to this miasmatic morass to undertake for the Government the exceedingly trying and hazardous task of playing at hide and seek with the Seminoles—found the facts to be. But clinical lessons were learned to prove of national value later. Bleeding in malaria, for instance, was found to be injurious—universally and decidedly; and the favorite panacea was generally abandoned. Cathartics, given as a part of routine prophylaxis and as an adjuvant to quinine, were found extremely beneficial; and Porter's statement that they are particularly well borne by soldiers is easily believed when we learn that 8-10 grs. of calomel followed by oleum ricini, or 15-20 grs. of calomel alone were no uncommon dose. Tamarind water was found to be the best nourishing drink, rarely disagreeing with the stomach, always grateful and never causing the gastric pain and vomiting which occurred when limes or lemons were used. The value of capsicum was also amply demonstrated. But the *great* clinical lesson of the war was what it taught of quinine—establishing in part the wisdom of certain methods for its use, in part only corroborating what others had previously suggested. The reports made came chiefly from two United States posts—Fort White and Fort King. At the former, in the very unhealthy summer of 1839—when fevers were prevailing throughout Florida and yellow

fever on the coast—"malarial" diseases occurred in number; [177] but the only fatal cases were two, one from congestive fever and one from cholera infantum: a result to be ascribed, said Surgeon Porter, "almost entirely to the use of quinine in pretty large doses (8-10 grs.) early in the disease." In 1840, the year following, the rainy season was prolonged, 90 inches of rain fell at Tampa Bay and the general health of Florida improved. Yet the troops in the interior suffered severely from fever, diarrhœa, and dysentery. At Fort King an epidemic broke out which involved nearly every man, woman, and child in the post. Two hundred and seventy patients were taken sick in April and May—and this in a garrison four infantry companies strong. Here was an opportunity to study the disease at close range; and Surgeon Porter improved it. He prescribed quinine and he prescribed it in large doses. Chamomile tea, capsicum, and cathartics were used unsparingly but quinine was given and given in confidence. It was ordered at the onset of the disease (grs. xv-xx-xxv) and it was repeated p. r. n.—"quinine sulphate \mathfrak{D} ss" appearing frequently in the medical orders. Here is the way drugs were handed out to these patients—being excerpts from the clinical notes on a Lieutenant of the 2d Infantry:

"3 p. m.—Slight attempt at perspiration which soon subsided and at retreat the symptoms were the same as at 1 o'clock, with the addition of great restlessness and uneasiness. \mathfrak{R} hydrarg. chlor. mit. gr. i, pulv. antimonialis gr. ii, morph. sulph. gr. $\frac{1}{6}$. *To be continued at intervals during the night.*" (The italics are mine.) The next morning, the clinical clerk who must have had a grim sense of humor, made this note: "Obtained some sleep during the night." Quinine treatment (grs. xv) was instituted. On the 17th the 1 p. m. order was "No medicine;" and at retreat the significant entry was made, "Has been in a quiet sleep." The simple life was, however, not to continue and at tattoo this strenuous order was left: " \mathfrak{R} hydrarg. chlor. mit. gr. i, pulv. antimon. gr. ii, morph. sulph. gr. $\frac{1}{6}$, a seidlitz powder at 2 a. m. and 10 grs. of quinine at reveillé." The patient recovered. Not only was quinine found to prevent the paroxysms and cure the patient but it seemed, combined with capsicum, to be the best remedy for

[177] the distressing gastric irritability—particularly marked among the recruits—which was apparently so important a feature of the disease. “The paroxysms,” a medical writer before the Seminole War had written, “continue to recur until either a salutary crisis or death takes place—one or the other of which not infrequently occurs in the third paroxysm.” But this was with the ordinary treatment in which quinine was used only as a tonic late in the course of the disease; and the experience of the army physicians with quinine showed that such a fatalistic philosophy was not warranted. The drug was used by them in ten times the usual dose not as a tonic but as “*the certain antidote*;” convalescence was “immediate and invariable;” and “the termination by crisis,” to quote Surgeon Porter, “was created rather than awaited.”

To the world-wide medical interest, then, in malarial conditions and in quinine manifested in the first decades of the 19th century, the trials and successes of the Florida war had added an interest that was provincial and national; and when Fort Sumter fell, the dreadful diseases for which quinine was to be needed must have loomed large in the medical minds which were planning for a disagreeable and uncertain future and to which the absolute necessity of this staple of war must have been distressingly apparent. For the drug, as was to be expected and as the event proved, was to be the chief reliance in two of the largest groups of disease during the Civil War—the alvine fluxes and the camp fevers.

The alvine fluxes, according to the official nomenclature, included the acute and chronic diarrhoeas and the acute and chronic dysenteries; and they were, indeed, the bane of the armies. The statistics are little short of amazing. The fluxes were more frequent and produced a greater mortality than any other disease. They were responsible for about one-half of all the cases of sickness and caused, with scurvy, 831 of every 1000 deaths from disease. They appeared at the beginning of the war and in regiments before organization. It often happened in the hospitals that more were sick from dysentery than from all other causes; and when it is remembered that the proportion of deaths from disease to the deaths from wounds was about as two to one among the whites and as over

eight to one among the negroes, the tremendous economic [177] problem this disease presented becomes apparent. In the white and colored troops of the North from the beginning of the war to June 30th, 1863—that is before Gettysburg had been fought, or Vicksburg had fallen, or the draft riots had been quelled in New York—nearly 1,800,000 cases had been recorded under one of the four alvine fluxes; and, at a conservative estimate, almost 60,000 soldiers had died from the disease. The Union had lost, from dysentery, in other words, an army twice the size of the garrison which made Grant [178] famous by surrendering to him, over five times as many men as the killed and wounded at Chancellorsville; troops equal to about three-fourths of the forces which turned the tide of the war by repulsing Lee's invasion of the North. In three Indiana regiments alone, representing a strength of 3000 men, the reports, though exceedingly incomplete and including only a part of the war, list 1567 cases of dysentery. The number of those on sick report for the fluxes was to the total of all diseases as, approximately, one to four. For the single year ending June 30, 1863—the year that began with the Emancipation Proclamation and ended with Lookout Mountain—nearly 522,000 cases of dysentery were reported with 10,554 deaths. Yet Chancellorsville was called a terrible and sanguinary conflict. In the Confederate Army similar conditions were prevailing. From July, 1861, to March, 1862, the Army of the Potomac with a mean strength of about 50,000, reported over 36,000 cases of alvine flux—740 cases, that is, to 1000 of mean strength; and no doubt the medical records, destroyed at the fall of Richmond, would have shown a similar state of affairs throughout the war. The disease, said Surgeon Jones, “destroyed and injured permanently more men than shot and shell.” At Capt. Wirtz's notorious Andersonville prison for about 15 months during '64 and '65 nearly 18,000 prisoners were admitted to the hospital. Four hundred and fifty odd of these were wounded and about 16,000 suffered with a specified disease. The results were recorded in about 15,000 cases and the mortality was 73.7 per cent. Over seven thousand cases of diarrhoea were listed; and, excluding cases not followed, 80.3 per cent of them died. In

[178] other words in a hospital with 18,000 medical and surgical patients admitted during a short year and a half there were over 5000 known deaths from alvine flux alone.

To combat this wide-spread contagion quinine was, of course, not exclusively or perhaps chiefly used. Ipecac and a whole host of other drugs were the stand-bys. But Peruvian bark and what Dr. Woodward calls its "precious alkaloid," were extensively ordered. The drug had been used with good results by Richard Morton in the London epidemic of 1666 and later by York in 1709. Moreover dysentery was still vaguely thought of as a "malarial" condition and that was indication enough for quinine. And so it was prescribed; prescribed for the prostration accompanying dysentery, for the debility of convalescence and for the cases complicated with malaria; it was even in some cases prescribed to excess; but these errors said Dr. Woodward, were "among the most pardonable and least injurious of the therapeutic errors of the Civil War."

But the chief call for quinine came, of course, from camp fevers; and it was a loud call, and a strong, and a constant. The camp fevers of the war included typhus and typhoid, common continued fevers (after June 30, 1862, reported as "other miasmatic disorders"), remittent fever, quotidian, tertian, and quartan fevers, and congestive intermittent fever. The question of diagnosis was, of course, still somewhat unsettled. Even typhus and typhoid were not clearly distinguished. The work of Louis had, indeed, appeared in 1829; Gerhard and Pennock had published in 1837, Shattuck in 1839, and Bartlett and Wood in the early 40's. Yet Dickson, of Charleston, as late as 1855 quoted from Campbell with approval, "The necessity which any theory may involve of separating typhus gravior and mitior is enough of itself to declare its absurdity;" and of the three text-books furnished the medical officers during the war (Wood, Watson, and Bennett), two were non-identist and one monistic. Of course the diagnosis was made entirely from clinical features; and though certain cases of typhus probably got into the typhoid statistics the error was apparently not a large one. As to "typho-malaria," however, there was much confusion. The term was introduced by

Woodward in 1862 for those hybrid fevers which he thought ^[178] due to a combined poison—modified, in some cases, by a “scorbutic taint.” He hoped by this innovation to clarify the diagnostic atmosphere; but he succeeded in befogging it. The terms came to be used by the army surgeons to include those febrile remittents which assumed the adynamic form present in enteric fever, and enterics with malarial complications. *True* malaria—remittent and intermittent—was pretty well recognized. But it is, of course, in the statistics of the aggregate camp fevers and not in the statistics of the separate groups, that we are interested; and, as in the case of the alvine fluxes though less notably than in that case, the figures are huge. One quarter of all the cases of disease among the white troops were of a malarial character. This does not include a large number of cases complicated with pneumonia and other diseases and reported under those headings. Nor does it take any account of the great number of recurrent cases which were treated by the men themselves—who recognized and became used to ague fits, took quinine and were simply excused from duty by their company officers without reporting to the surgeons. Yet even so, consider the extensive ravages of the disease. From May, '61, to June, '66, over 1,100,000 cases of pure malaria and nearly 50,000 of typho-malaria were reported among the white troops. Of these 12,199 died. In other words there were 2814 cases of malarial disease and over 26 deaths from malaria per 1000 of mean strength. In three years of service nearly 160,000 cases, with over 3000 deaths, occurred among the colored troops. In the Confederate Army of the Potomac (roughly 50,000 men strong) 1865 cases of malaria occurred between July, 1861, and March, 1862; and at Andersonville in about six months, there were 3000 cases and 119 deaths.

But the camp fevers, so rife throughout the war, made for themselves, a special name and fame in the second twelve-month. The year was 1862, the Bull Run fiasco had been almost forgotten, Scott had retired and McClellan was looming as the most important military figure of the Unionist forces in the East. The giant North, having stood at gaze for some months had taken a few slumbering and blundering

[178] steps forward and was now beginning to awake to the true significance of things; but meanwhile the alert David, with a
[179] sling and a few smooth stones from the brook, had been doing telling though not fatal work. "On to Richmond" had been the cry at the North during the winter; and in the spring McClellan responded. On account of transportation facilities he chose for his famous campaign that famous strip of land lying between the York and the James. Here it was that the colonies had gone to childbed to be delivered of the nation; and here Lafayette, Cornwallis, and Washington had seen her travail pains, and her rejoicings that a son was born into the world. Through this historic ground McClellan pressed until, by the close of May, he found himself within seven miles of Richmond. Then came the news that expected reinforcements could not be sent and the Army of the Potomac was left to its own resources in the Chickahominy Swamps. Malaria and typho-malaria—familiarly called "Chickahominy fever"—soon became prevalent. Meanwhile Stonewall Jackson had joined Light Horse Harry Lee's son—who was now rapidly forging to the front; and McClellan's thin and fevered army was gradually pushed back by July 1, to Malvern Hill. Richmond was safe and Lee was able to assume the offensive. The Peninsula which had perpetuated the names of Washington and Lafayette and Cornwallis as soldiers, which had tested the mettle of McClellan and had insured the fame of Lee left also its mark in medical history by adding to its nomenclature "Chickahominy fever" and by emphasizing the great disabling power of this disease.

The drug that had to be provided for this second widespread group of diseases was the drug which was being used so extensively in the alvine fluxes; but do not suppose it to have been an entirely settled question, at the outbreak of the war, that quinine was a malarial antidote. Peruvian bark had indeed been so regarded by Lind as early as 1765, and also by Hunter, Clark, and others. But James Johnson, in Calcutta, had re-introduced venesection; and though quinine had been discovered in 1820, Sir J. Martin—writing as late as 1861—said, "Quinine, the great febrifuge acts * * * purely as a nerve tonic to the cerebro-spinal and visceral sympathetic sys-

tem," and "bleeding * * * is very generally necessary in the [179] severer forms of Bengal remittent fever; then come full doses of calomel and sudorifics short of producing salivation, with saline purgatives, antimonials and refrigerants and quinine in the intervals." At the same time, however, Hare, in India, was using the drug in large doses and as an antidote; and in 1836 Maillot, in France, from a study of many thousand cases spoke of laxatives and purgatives in malaria as obsolete ideas and concluded that quinine should always be used. "All the morbid phenomena," said he, "will disappear as if by enchantment in a few hours." Ten years before this, Perrine, treating the disease in Mississippi, had used and advocated quinine strongly; and it seems probable that he was the first to insist on large doses. Surgeon Harvey, however, in the Florida war had been one of the early extensive users and staunch advocates of the drug; and the result of all this was that, when the war cloud really broke, quinine, though there were still prominent dissenting voices, was regarded as the specific drug for malaria and became, as a matter of fact, the *sine qua non* throughout the strife, practically no other antiperiodics being used. Even "prophylactic quinine" was recommended in the "Rules for Preserving the Health of the Soldier," published by Van Buren in 1861; so that there can be no doubt as to the fact that the treatment of malaria was then fully understood.

I have said nothing, in calling attention to the terrific dimensions of the camp fevers and the alvine fluxes during the war, of the sub-acute and chronic distress they occasioned; yet, as a matter of history, this feature was quite as marked as the more acute manifestations. For war—the typhoid of nations—resembles its clinical prototype not alone in bringing prostration, depression, and suffering, nor in exacting a high bounty of life. It is like it in this other respect, too, that it collects its usury in long continued instalments, leaves behind, for days after defervescence and convalescence, reminders of itself in the shape of debility, distressing sequelæ, and a motley array of disabilities. One thinks, for instance, of the march of the army of Charles VIII through Europe in 1494, with the conquest of the Italian Peninsula in contemplation and a highly pious ambition to reach Jerusalem; but ending by

[179] making the name of Fracastorius' shepherd a household word throughout Europe and starting it on its way toward Persia and Turkey and the Orient. What indeed, for the common weal of Europe, or of the world, were the paltry lives lost on the march? A continent syphilized—here was the real ravage of an army; and that same continent, feeling keenly to-day the distressing and disabling sequels of the acute fever which it has now well-nigh forgotten, illustrates what distress a war can set in motion. Or a few French soldiers buried in Algiers: was *their* loss a national calamity? A calamity, at least, at all comparable to the army's introduction, on its return, of a new febrifuge which turned out to be the baptism—or better—the immersion of French national progress in absinthe? Some day the full story of the late effects of war will be written; and it will be an illuminating chronicle. Of our own intestine upset it is, of course, even yet not uncommon to see the sequelæ in wrecked constitutions and disabilities of every nature; but if we needed any other reminder of the state of affairs than the Pension Budget we would find it in a glance at the statistics of war times. Look, for example, at the facts as to diarrhoea and dysentery. Seventeen thousand three hundred and eighty-nine white soldiers were discharged from the fighting army on certificate for disability due to these two diseases; and a very large number of the 15,000 discharged for “debility” were really dysenterics. So also were a large proportion of those discharged for anæmia, dropsy, etc.; and of the great number of dysenteries mustered out at the end of the war and not entered on the reports we shall never have any accurate conception. So, too, as regards malaria which was the real cause of a large proportion of the, approximately, 102,000 general debilities and miasms, of the 21,872 anæmias, of the nearly 8000 dropsies reported; and when we learn that almost [180] 15,000 white soldiers were discharged for “debility” alone we realize what a tremendous feature the late results of malaria were.

Here then were the elements for a good quinine market when the war came. A widespread medical interest in the drug, a strikingly successful national experimental test of it fresh in the medical mind, a prospect of the wide prevalence of one

disease calling loudly and of another calling exclusively for it [1861]—these things meant that much quinine would change hands between 1861 and 1865. And much *did* change hands. The Purveyor's Report for the war lists the purchase of about 393,000 dozen quinine sulphate pills; of over 500,000 oz. of fluid extract of cinchona; of 260,000 oz. of powdered calisaya bark; of nearly 600,000 oz. of quinine sulphate; or, briefly, a total of over 19 tons of quinine sulphate, and over 9½ tons of sulphate of cinchona—beside other preparations. Compare this with the 220,000 quarts of castor oil bought; with the 683,000 dozen c.c. pills; with the 515,000 pounds of Rochelle salts, and you will see that quinine was, indeed, as I have already said, playing Romeo to cathartic's Juliet. In the Confederate camp, too, the drug was used in quantity. It was a contraband of war; but it got through. Not, however, in sufficient amount. Nor could it be brought from Europe past the blockade; and Dr. Jones found it necessary to urge a search for an indigenous substitute, which was, strangely enough, to make the South independent of the North not only during the war but afterward, when she had become an established nation. Georgia bark and dogwood were both tried in this extremity; and both proved failures.

So much for the probable needs and the actual demands of the two armies in regard to quinine. To whom was the government to look for the tremendous supply required? On August 29, 1904, William Weightman, popularly known as the richest man in Pennsylvania and certainly one of the largest real estate owners in the country, died in Philadelphia. He was a singularly reserved man, a captain of industry, a practical scientist of rank; a man of sagacity, energy, and thrift, who amassed a fortune of at least \$50,000,000 and died in the harness. Eminently fitted to serve the community he had little in common with it, finding his chief interests in the making of a fortune and the raising of chrysanthemums to a variety of which his name became attached. He owned more property in Philadelphia than the Pennsylvania or the Reading Railroads. The Garrick Theatre and the Hale Building—assessed at \$2,000,000—were two of his holdings. He made it a point never to sell any of his properties—the only exception

[180] to this rule being the sale of the Bingham House, which brought him \$1,000,000. The store of Darlington & Co. belonged to him; whole blocks in Philadelphia were his; and his personal property tax return for 1903-1904 was over \$5,000,000. Here we find, then, the resting place of the dollars that went for those 19 odd tons of quinine and of the many thousands of dollars that followed them when the monopoly established during the war lived on and grew fat. At the outbreak of the war there were but two chemical houses in the country engaged in the manufacture of quinine from Peruvian bark. Powers & Weightman, and Rosengarten & Sons, both of Philadelphia. Previously the properties of the bark had been obtained by a process of suffusion; but these two firms, quickly introducing the method for separating quinine—invented by the French chemists, Pelletier and Coventon in 1820—were soon without successful rivalry in the American manufacture of the drug. And before long the price of the drug (\$2.10 per ounce at the outbreak of the war) was, by reason of this monopoly aided by certain economic conditions, soaring heavenward. Alcohol, the essential solvent of quinine carried a heavy internal revenue tax; so that a duty was placed on imported quinine sulphate in order to allow the American drug to compete with that imported from Germany and other countries where alcohol was free. The duty was 45 per cent; but the government, buying its quinine duty free, was able to avoid the monopoly of the American firms. Not, however, until large bills for the drug had been incurred. In New York alone nearly \$591,000 were spent for quinine, \$418,000 of this going to J. H. Reed & Co., who were customers of Powers & Weightman; and the payments made to the latter firm themselves for drugs and medicines during the war amounted to over \$231,000, of which a large share went for quinine. But, though the records of these transactions are, obviously, not complete in detail, the Confederates, too, were swelling the bank account of the northern Trust. The drug was contraband and had to be shipped South minus all markings. Moreover Powers, the head of one firm, was a loyal and ardent Unionist; while Adolph Rosengarten, a member of the other, was killed at Murfreesboro after having risen to the

rank of major in Anderson's Cavalry. Yet the South got its ^[180] drug—stored on one occasion in mattresses; and it paid for it, at one time as much as \$15 an ounce.

After the war, however, the firm, though becoming fabulously wealthy, began to become extremely unpopular as well. The war duty on the bark had been lifted in 1870; in 1872 the duty on the sulphate had been reduced to 20 per cent. Yet the Philadelphia firms became by no means lean kine. The monopoly, it began to be rumored, was being overdone; the tariff-tax on quinine, prohibiting the sick-poor from using the drug, was grimly nicknamed the "tax on blood;" what had been termed business sagacity began to look like scandalous greed; and a popular cry for redress sounded. Even the *New York Tribune*, the most rabid high tariff newspaper in the country, fought valiantly for repeal; and finally the Government yielding to the country's importunity removed the tariff on quinine under the Dingley bill of 1897. Meanwhile the drug has become immeasurably cheaper. Cinchona has been transplanted to Java, Ceylon, and India, where it grows so extensively that the supply exceeds the demand. Improvement in cultivating the bark has resulted in doubling the yield of quinine to the pound of cinchona. Solvents other than alcohol have come into use—fusel-oil and coal-tar chiefly. And the quinine of commerce—which was quoted in 1861 at \$2.10 the ounce and brought as high as \$15.00 below the line—sells for ^[181] 21 cents an ounce.

Looking ahead then to our next civil, or perhaps colonial, war, it does not seem likely that the quinine problem will loom large. The question of duty has been settled; and even if this were not so the government would probably settle it in the event of war by passing a general provision, as was done at the time of the Spanish War, to suspend the operation of the tariff law on all materials required by the War Department. There are still only three firms in the country manufacturing the drug—the two already mentioned and the New York Quinine and Chemical Company. Yet the Government might easily elect, if monopoly again threatened to become embarrassing, to establish its own chemical and supply factories—as was done during the Civil War, with a saving to the Gov-

[181] ernment at the Philadelphia laboratory alone of over \$766,000 between March, 1863, and September, 1865. As for the supply of the drug to the country—so long as our present coast-line persists a complete blockade seems rather improbable. Yet the quinine problem was a very real one in the struggle between the North and South. If, as Goldwin Smith said in his Manchester speech, the conclusion of the war meant that slavery was dead everywhere and forever this was an achievement worth paying something for. But in estimating the price, do not think only or chiefly of the life lost in the four unfortunate years. Remember as well the disability and debility they left behind them; and in considering the vast financial perplexities which came when reconstruction days began, do not overlook the quinine monopoly which the war had made possible but which a suffering people finally overthrew.

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